Grade 4: Cited CCCs and their Bullets

PATTERNS In grades 3-5, students identify similarities and differences in order to sort and classify natural objects and designed products. They identify patterns related to time, including simple rates of change and cycles, and use these patterns to make predictions.

- **Similarities and differences in patterns can be used to sort, and classify designed products. (4-PS4-3)**
- **Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena. (4-PS4-1)**
- **Patterns can be used as evidence to support an explanation. (4-ESS1-1), (4-ESS2-2**)

CAUSE AND EFFECT In grades 3-5, students routinely identify and test causal relationships and use these relationships to explain change. They understand events that occur together with regularity might or might not signify a cause and effect relationship.

- **Cause and effect relations are routinely identified.** (3-PS2-1), **(4-PS4-2)**
- **Cause and effect relationships are routinely identified and used to explain change.** (3-LS2-1), (3-LS3-2), (3-LS4-2), (3-LS4-3), **(4-ESS3-1),** (5-PS2-1)
- **Cause and effect relationships are routinely identified, tested, and used to explain change.** (3-ESS3-1), (3-PS2-3), **(4-ESS2-1), (4-ESS3-2),** (5-PS1-4)

Systems and System Models In grades 3-5, students understand that a system is a group of related parts that make up a whole and carry out functions its individual parts cannot. They can also describe a system in terms of its parts and their interactions.

- **A system can be described in terms of its components and their interactions.** (3-LS4-4), **(4-LS1-1), (4-LS1-2),** (5-LS2-1), (5-ESS2-1), (5-ESS3-1)

ENERGY AND MATTER In grades 3-5, students learn matter is made of particles and that energy can be transferred in various ways and between objects. Students observe the conservation of matter by tracking matter flows and cycles before and after processes and by recognizing that the total weight of substances does not change.

- **Energy can be transferred in various ways and between objects. (4-PS3-1), (4-PS3-2), (4-PS3-3), (4-PS3-4),** (5-PS3-1)

Dr. Art's Recommendations re CCCs in Grade 4

NOTE: Please read the Dr. Art recommendations for the entire Grade 3-5 Span before reading the recommendation for this grade level.

Patterns and **Cause and Effect** are the two main CCCs that are cited from Kindergarten through Grade 3. This emphasis continues but begins to decrease in Grade 4 where almost half the citations are for other CCCs.

Patterns that are embedded in Grade 4 Performance Expectations and phenomena include kinds of waves and wave properties (4-PS4-1, 4-PS4-2, and 4-PS4-3); kinds of rock formations and locations of fossils in rock layers (4-ESS1-1). Grade 4 Patterns CCC bullets focus on using patterns to support an explanation. Grade 4 Patterns CCC bullets also extend the sorting and classifying in Grades K-2 to now include designed products, and also to analyze simple rates of change for natural phenomena.

The main **Cause and Effect** CCC bullet in Grades 3-5 states: "Cause and effect relationships are routinely identified, tested, and used to explain change." In several instances the cited bullets omit some of the words and phrases, but this longer statement provides the goal for the grade and grade span. Grade 4 Cause and Effect contexts include environmental effects of fuel usage (4-ESS3-1); factors that affect rates of weathering and erosion (4-ESS2-1); and how reflection of light enables seeing of objects (4-PS4-2).

Grade 4 also uses the CCC of **Systems and System Models** to help investigate and explain internal and external structures of plants and animals (4-LS1-1). Sense receptors and information processing provides an engaging context for analyzing system components and their interactions (4-LS1-2).

Through the CCC of **Energy and Matter**, Grade 4 also introduces a new focus via four citations on various ways that energy can be transferred between objects. Cited contexts include the speed of moving objects (4-PS3-1); transfers involving sound, light, heat, and electric currents (4-PS3-2); collision of objects (4-PS3-3); and designing/refining a device that usefully converts energy from one form to another (4-PS3-4).

